

REMARKS/ARGUMENTS

Claims 1-12 are presently pending in this application. Claim 13 has been canceled.

All independent claims 1, 6 and 12 were rejected for anticipation by the Clemens patent (5,130,532).

Specifically, claim 1 was rejected for anticipation because "light guides [26, 28, 29] (see Fig. 1) are provided for the transmission of the synchronization signal (see Fig. 2)".

Claim 1 is directed to a light grid with a transmitter unit having a plurality of light transmitters and a receiver unit having a plurality of light receivers. Respective pairs of transmitters and receivers are successively activated in dependence on a synchronization signal that is transmitted between the transmitter unit and the receiver unit by "at least one light guide ... which connects the transmitter unit with the receiver unit for the transmission of the synchronized signal".

As a result, the transmissions of the monitoring signal, and their synchronization, are uncoupled. Consequently, the presence of an object in the monitoring region does not affect the synchronization procedure.

In the embodiment of the invention defined by claim 1, respective pairs of light transmitters and light receivers which bound the monitoring region can be successively activated in time in dependence on the synchronization signal which is present at both the transmitter unit and the receiver unit via the light guide.

The advantage of this embodiment of the invention is that the transmission of the monitoring signal in the monitoring region and the synchronization procedure are totally uncoupled. An object in the monitoring region therefore does not and cannot influence the synchronization procedure.

This is explained in more detail in paragraph 0006 of the Substitute Specification as follows:

... the synchronization procedure is fully uncoupled from the transmission of the monitoring signal in the monitoring region and thus a synchronization takes place between the transmitter unit and the receiver unit which is independent of the light transmission path between the transmitter unit and the receiver unit in the monitoring region. The light guide in accordance with the invention provided separately for the transmission of the synchronization signal ensures that a reliable synchronization of the receiver unit takes place in dependence on the transmitter unit irrespective of a feed of an object into the monitoring region and irrespective of its position and movement within the monitoring region.

In the anticipation rejection of claim 1, it was observed that Clemens discloses "light guides [26, 28, 29]". However, none of these elements of Clemens are light guides.

Reference numeral 26 in the Clemens patent refers to "a common time multiplex line 26 by which the signal present in time multiplex is passed to the amplifier 14" (col. 6, lines 10-12).

Reference numeral 28 of the Clemens patent refers to "a common clock line 28" (col. 4, lines 67 and 68) of transmitter modules 7 which originates from the clock source control.

Similarly, reference numeral 29 of Clemens refers to a "clock line 29" (col. 5, line 13 and col. 6, line 64) of the receiver modules 8.

In fact, it is the main purpose of the Clemens patent to avoid special lines which connect the light emitter and light receiver rows. In this regard, Clemens states:

The requisite synchronisation between the transmitter side and the receiver side has previously been produced by special connection lines between the light source control and the receiver control which is of disadvantage, in particular with light sources and light receivers arranged at opposite sides of the region to be monitored.

The invention is thus based on the object of providing a light barrier grid of the initially named kind which ... ensures problemfree synchronised operation of the light sources and the light receivers, in particular also when connection lines are absent between the light source unit and the light receiver unit.

As a result of this construction special connection lines between the transmitter and receiver units can be omitted, which is of decisive advantage, in particular when the light sources and the light receiver are arranged at opposite side of the region to be monitored. (col. 1, lines 25-43, underlining added)

In the context of the Clemens patent, the light grid disclosed therein has a transmitter unit and a receiver unit with pluralities of light sources 5 and receivers 6, respectively. Clemens seeks to ensure problem-free, synchronized operation of the light sources and the light receivers. However, Clemens does not have and nowhere discloses or in any form suggests to provide light conduits as recited in claim 1 or that reference numerals 26, 28 and/or 29 refer to light guides. Indeed, such an arrangement would run counter to Clemens' objectives, as is apparent from the above-quoted excerpts from Clemens.

As is clear from Fig. 1, there are no light guides between transmitter row 1 (which has seven transmitter modules 7) and receiver row 2 (which correspondingly has seven light receivers 6). Common clock lines 28 and 29 of transmitter row 1 and receiver row 2 only connect receivers modules 8 with receiver control 10 and transmitter modules 7 with light source control 9.

The same comment applies to multiplex line 26 in receiver row 2 and illustrated in Figs. 1 and 3. The multiplex line 26 connects electronic switches 12 forming a multiplexer, as is described in column 6, lines 8-19 of the Clemens patent.

Neither of the three lines 26, 28 and 29 of Clemens extends between the transmitter row 1 and the receiver row 2. To the contrary, they are wholly contained within one or the other. Thus, none of the three lines is intended to or capable of acting as a "light guide which connects the transmitter unit with the receiver unit for the transmission of the synchronization signal" as is recited in claim 1.

Accordingly, Clemens does not anticipate claim 1.

Claim 6, also rejected for anticipation by Clemens, recites in relevant parts that "the synchronization signal is transmitted during operation from the transmitter unit to the

receiver unit via changing pairs of light transmitters and light receivers associated with one another”.

Transmitting the synchronization signal over different pairs of transmitters/receivers ensures a secure and reliable synchronization even when an object is located in the monitoring region, because a transmitter/receiver pair and the light transmission path between them will quickly select a transmitter/receiver pair which is not interrupted by the object. As a result, there will be, at most, only a short, momentary loss of the synchronization signal between when a light beam is first interrupted by an object and when another transmitter/receiver pair that is not interrupted by the object is selected for the transmission of the synchronization signal.

Clemens contains no disclosure and nowhere even mentions to transmit the synchronization signal via changing pairs of light transmitters and receivers. This is also not shown or in any form suggested in Fig. 2, which shows the time sequence of the activation pulses for the transmitter modules of the transmitter row. The transmitter pulses have a duration of T_S and they are detected by corresponding receiver modules if no object lies between them. Synchronization is attained with a synchronization pause T_P that is present between the last transmitter pulse of one cycle and the first transmitter pulse of the next cycle. No synchronization via changing pairs of light transmitters and receivers is involved, described or in any form suggested.

Thus, Clemens does not teach to transmit the synchronization signal via changing pairs of light transmitters and receivers and, therefore, does not anticipate claim 6.

Independent claim 12 was also rejected for anticipation by Clemens, which was viewed as disclosing a control unit [9, 10] for transmitting the synchronization signal between the transmitter and the receiver “via changing pairs of light transmitters and receivers”. Although claim 12, as compared to claim 6, additionally recites the use of a control unit, the lack of any relevant disclosure in Clemens concerning the use of changing pairs of light transmitters

and light receivers does not anticipate claim 12, for the same reasons why Clemens does not anticipate claim 6.

In view of the foregoing, applicants submit that independent claims 1, 6 and 12 are not anticipated by Clemens and are, therefore, allowable.


Dependent claims 2-5 and 6-11 are directed to specific features of the present invention which are patentable in their own right. These claims are further allowable because they depend from allowable parent claims.

CONCLUSION

In view of the foregoing, applicants submit that this application is in condition for allowance, and a corresponding notification to that effect at an early date is requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at (415) 576-0200.

Respectfully submitted,


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